

## Browned Out And Confused

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Numerous Army studies conducted over the years show spatial disorientation plays a significant role in the number and outcome of rotary-wing accidents. Although these studies have provided valuable insight into this problem, until recently SD had never been studied specifically in combat. To fill this information void, the U.S. Army Aeromedical Research Laboratory evaluated summaries of all Class A through C Army rotary-wing accidents in operational areas (excluding loss from enemy action) from October 2000 to June 2005.

The results of our study were disturbing. Although the rate of SD-related accidents in training was about 27 percent of all Class A through C accidents, that number jumped to 37 percent in combat. Not only have these accidents become more frequent, they've also become more lethal and expensive. Of the 151 accidents studied, 56 were directly attributed to SD and killed 45 Soldiers while injuring almost twice that number. The rate of nearly one death per SD accident in combat is more than double that seen in CONUS training accidents. The high financial cost of \$5.96 million per accident, which is three times the cost of accidents not attributed to SD, reflects the high proportion of destroyed aircraft.

Why are SD accidents so lethal and expensive? The answer probably lies in the environmental conditions in which most of our combat flying has been conducted over the last few years. The majority of SD accidents we studied occurred in phases of flight close to the ground, and 34 of the 56 accidents (61 percent) were caused by brownout. Another piece of supporting evidence regarding environmental conditions is just as many accidents are happening during the day as at night. Before we began operations in these dusty countries, the overwhelming majority of our SD accidents happened at night.

The obvious association here is restriction of an aircrew's visual cues. Anyone who's ever landed in a desert knows vision suddenly is lost when a dust cloud catches up to the aircraft. Our analysis showed numerous crews continued their maneuvers despite losing all visual reference and crashed as a result. These crews became acutely disoriented and didn't deal with what can be a completely overwhelming situation.

So what's the answer? There are potential technological fixes in the works, but as of yet there's no "magic bullet" that allows completely safe flight in a dust cloud near the ground. The themes that kept recurring during this study were incorrect procedures and poor crew coordination.

The first thing that stops in highly stressful situations such as flying into a dust cloud is effective communication. Crews often lose their normally excellent coordination and vital information is lost or never transmitted. Any crewmember might have the information that could save the aircraft, but they often don't say a word because the guy on the sticks appears to be "maxed out."

Crew coordination and the confidence to throw away a bad situation are the two best tools in the box to avoid a brownout accident. Enhancing those tools with good flight procedures and training gives us the best armament we have to stop people dying in the dust.

